

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions of claims in the application:

Listing of Claims:

1. (Currently amended) A system that facilitates generation of code from a HMI representation of objects in an industrial automation environment, comprising:
 - a component that analyzes the HMI representation of objects, each object that comprises the HMI representation is dynamically subsumable into other objects included in the HMI representation to form distinct HMI objects that include features of both subsumed objects, the analysis based at least in part on a relatedness of each object that comprises the HMI representation and a feasibility determination for implementing the HMI representation;
 - a historical component that links the HMI objects to templates used to create them, the system propagates changes made to the templates through at least a subset of the HMI objects;
an artificial intelligence component that generates an arrangement of the HMI objects based upon at least one of user characteristics, context, or prior arrangements made by the user;
 - and
 - a code generation component that generates code based at least upon the analyzed HMI objects.
2. (Original) The system of claim 1, the code being control code that governs actions of industrial components.
3. (Original) The system of claim 1, the code being at least one of ladder diagrams, function block diagrams, structured text, instruction lists, and sequential function charts.
4. (Original) The system of claim 1, the code relayed to at least one industrial component comprising a processing device.

5. (Original) The system of claim 4, the processing device being a programmable logic controller.
6. (Original) The system of claim 1, further comprising a library of disparate HMI objects.
7. (Previously presented) The system of claim 6, the HMI representation of objects comprises one or more HMI objects of the library.
8. (Original) The system of claim 1, further comprising an editing component that enables editing of the HMI representation of objects.
9. (Original) The system of claim 8, the editing component comprising a modifiable template.
10. (Original) A HMI comprising the system of claim 1.
11. (Original) The system of claim 10, the HMI being a fixed HMI.
12. (Original) The system of claim 10, the HMI being a tethered HMI.
13. (Original) The system of claim 10, the HMI being a wireless HMI.
14. (Previously presented) The system of claim 1, the code generation component comprises an intelligent component that automatically generates code of a program language desired by a user.
15. (Previously presented) The system of claim 1, the code generation component comprises an intelligent component that automatically compiles code in an executable code format according to a processing device that receives the executable code.

16. (Previously presented) The system of claim 1, the code generation component outputs control code in a universal language, the control code automatically translated to a program language desired by a user by a first intelligent component, and the control code compiled into an executable code format according to a processing device that receives the executable code.

17. (Previously presented) A system that facilitates industrial automation, comprising:
one or more HMI objects, the one or more HMI objects subsumable based at least in part on a compatibility between two or more HMI objects, representing at least one of
an industrial component; and
an industrial action;
an arrangement of the one or more HMI objects that represent at least one of:
an industrial system comprising at least one industrial component; and
an industrial process comprising at least one industrial action;
the arrangement generated at least in part by an artificial intelligence component, the arrangement generated based upon at least one of user characteristics, context, or prior arrangements generated by a user;

a historical component that links the HMI objects to templates used to create them, the system propagates changes made to the template through at least a subset of the HMI objects;
and

a code generation component that generates code based at least in part upon the arrangement of HMI objects and an associative relationship between each of the one or more HMI objects that comprise the arrangement, the associative relationship is based at least in part on a feasibility determination for associating each of the one or more HMI objects.

18. (Original) The system of claim 17, further comprising an editing component that enables editing of the one or more HMI objects.

19. (Original) The system of claim 18, the editing component comprising a modifiable template.

20. (Original) The system of claim 18, the editing component facilitating multi-user development.
21. (Original) The system of claim 17, further comprising a creation component that enables creating HMI objects.
22. (Original) The system of claim 21, the creation component comprising a modifiable template.
23. (Original) The system of claim 22, the modifiable template employing graphical representations of HMI objects.
24. (Original) The system of claim 22, the modifiable template comprising a nested template.
25. (Previously presented) The system of claim 22, modification of the modifiable template effectuates altering one or more objects generated by the modifiable template.
26. (Original) The system of claim 17, further comprising an object generator that automatically generates the HMI objects.
27. (Original) The system of claim 26, the object generator utilizing artificial intelligence techniques to infer existence of one or more components within the industrial system.
28. (Original) The system of claim 26, the object generator utilizing artificial intelligence techniques to infer existence of one or more actions within the industrial process.
29. (Previously presented) The system of claim 26, the object generator receiving data comprising information relating to at least one of:
the industrial system;
the industrial process; and
generating HMI objects based at least in part on the data.

- 30. (Original) The system of claim 17, the arrangement of HMI objects displayed as a single HMI object.
- 31. (Original) The system of claim 17, further comprising a library of disparate HMI objects.
- 32. (Previously presented) The system of claim 17, the arrangement of HMI objects comprising at least one input and at least one output.
- 33. (Original) The system of claim 32, further comprising a connection mechanism that facilitates connecting HMI objects.
- 34. (Original) The system of claim 17 embodied in a computer readable medium.

35. (Currently amended) A system that automatically generates code to facilitate industrial automation, comprising:

means for receiving at least one HMI object for analysis, the HMI object representing one or more of:

an industrial component; and

a particular action of an industrial process;

means for arranging the at least one HMI object to represent one or more of:

an industrial system; and

an industrial process;

means for linking the at least one HMI object to a template from which the HMI object was created;

means for altering the template, and propagating the changes through at least a subset of the HMI objects;

means for generating an arrangement of HMI objects based upon at least one of user characteristics, context, and prior arrangements made by a user; and

means for generating code based on the arrangement of the at least one HMI object and the analysis of an interrelationship between the at least one HMI object that comprises the arrangement, the at least one HMI object combinable with one or more disparate HMI objects that comprise the arrangement to form a distinct HMI object with characteristics of the combined HMI objects, the combination based at least on a feasibility determination.

36. (Original) The system of claim 35, further comprising means for creating the HMI objects.

37. (Original) The system of claim 35, further comprising means for editing the HMI objects.

38. (Original) The system of claim 35, further comprising means for relaying the code to one or more processing devices.

39. (Currently amended) A method for automatically generating code to govern actions of an industrial system and/or process comprising:

receiving a HMI representation of at least one of:

an industrial system; and

an industrial process;

generating an arrangement of the HMI representation based on at least one of user characteristics, context, and prior arrangements made by the user;

linking the HMI representation to a template from which it was created;

propagating changes made to the template through at least a subset of HMI representations created from the template; and

automatically generating code based at least in part upon an interconnectedness analysis of the representation, the interconnectedness analysis employs a feasibility determination to ascertain compatibility of each HMI object included in the HMI representation, each HMI object associable with disparate HMI objects to create a distinguishable HMI object with synthesized characteristics.

40. (Original) The method of claim 39, further comprising:

automatically generating the representation of the industrial system and/or process by utilizing artificial intelligence techniques.

41. (Original) The method of claim 40, further comprising:

automatically generating the representation of the industrial system and/or process by utilizing plug-and-play technologies.

42. (Original) The method of claim 41, further comprising arranging HMI objects that represent at least one of an industrial system; and

an industrial process;

to create the representation of the industrial system and/or process.

43. (Canceled)